

Understand solving equations as a process of reasoning and explain the reasoning (Standard A.REI.1)	
Standard I.A.REI.1: Explain each step in solving a linear equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. Students will solve exponential equations with logarithms in Secondary Mathematics III.	
Concepts and Skills to Master	
<ul style="list-style-type: none"> • Understand, apply, and explain the results of using inverse operations. • Justify the steps in solving equations by applying and explaining the properties of equality, inverse, and identity. 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.CED.1 , I.A.CED.4 , I.A.REI.3	II.N.CN.2 , II.N.CN.8 , II.A.SSE.2 , II.A.SSE.3 , II.A.APR.1 , II.A.CED.1 , II.A.CED.4 , II.F.TF.8 , III.A.APR.1 , III.A.APR.7 , III.A.CED.1 , III.A.CED.4 , III.A.REI.2 , III.F.IF.8 , P.N.VM.8, P.N.VM.9, P.N.VM.10, and all standards related to proof and inverse

Support for Teachers

Critical Background Knowledge (Access Background Knowledge)
<ul style="list-style-type: none"> • Use properties of operations (throughout elementary: OA standards) to create equivalent expressions (7.EE.1 and 7.EE.2) • Apply and extend previous understandings of arithmetic to algebraic expressions (6.EE.3, 6.EE.4) • Reason about and solve one variable equations (6.EE.5, 6.EE.6, 6.EE.7) • Solve one variable equations (7.EE.4a and 8.EE.7)
Academic Vocabulary
Properties of operations (associative, commutative, distributive) and properties of equality (reflexive, transitive, symmetric), properties of inverse (multiplicative inverse)
Resources
Curriculum Resources : http://www.uen.org/core/core.do?courseNum=5600#70134

Solve equations and inequalities in one variable (Standard A.REI.3)	
Standard I.A.REI.3: Solve equations and inequalities in one variable. <ol style="list-style-type: none"> Solve one-variable equations and literal equations to highlight a variable of interest. Solve compound inequalities in one variable, including absolute value inequalities. Solve simple exponential equations that rely only on application of the laws of exponents (limit solving exponential equations to those that can be solved without logarithms). <i>For example, $5^x = 125$ or $2^x = 1/16$.</i> 	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Solve one-variable equations and literal equations to highlight a variable of interest. Understand and apply the properties of compound inequalities. Solve compound inequalities in one variable. Solve simple exponential equations that rely only on application of the laws of exponents (limit solving exponential equations to those that can be solved without logarithms). Solve absolute value inequalities. 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.CED.1 , I.A.CED.4 , I.A.SSE.1 , I.A.REI.1 , plus all two variable equations (rest of algebra and function standards)	All algebra standards (algebra and function is used throughout high school mathematics courses), all F.BF standards

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> Solving linear equations and inequalities in one variable (8.EE.7) Solve one- step equations (6.EE.7) and inequalities (6.EE.8) Solve two-step equations and inequalities (7.EE.4) Understand absolute value (6.NS.7) and solve absolute equations (8.EE.7c) Reason about and solve equations and inequalities (6.EE.5-6) Use properties of algebra to simplify algebraic expressions (7.EE.1-2)
Academic Vocabulary
Resources
Curriculum Resources : http://www.uen.org/core/core.do?courseNum=5600#70134

Solve systems of equations. Build on student experiences graphing and solving systems of linear equations from middle school. Include cases where the two equations describe the same line—yielding infinitely many solutions—and cases where two equations describe parallel lines—yielding no solution; connect to GPE.5, which requires students to prove the slope criteria for parallel lines (Standard A.REI.5-6)	
Standard I.A.REI.5: Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	
Concepts and Skills to Master	
<ul style="list-style-type: none"> • Explain the use of the multiplication property of equality to solve a system of equations. • Explain why the sum of two equations is justifiable in the solving of a system of equations. (Property of equality) • Relate the process of linear combinations with the process of substitution for solving a system of linear equations. 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.SSE.1 , I.A.CED.2 , I.A.CED.3 , I.A.REI.6 , I.A.REI.10 , I.A.REI.11 , I.A.REI.12	II.A.REI.7 , all systems of equations

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> • Graph a line (8.F.4) • Solve systems of equations graphically (8.EE.8)
Academic Vocabulary
Elimination by multiplication and addition, substitution
Resources
Curriculum Resources : http://www.uen.org/core/core.do?courseNum=5600#70134

Solve systems of equations. Build on student experiences graphing and solving systems of linear equations from middle school. Include cases where the two equations describe the same line—yielding infinitely many solutions—and cases where two equations describe parallel lines—yielding no solution; connect to GPE.5, which requires students to prove the slope criteria for parallel lines (Standard A.REI.5-6)	
Standard I.A.REI.6: Solve systems of linear equations exactly and approximately (numerically, algebraically, graphically), focusing on pairs of linear equations in two variables.	
Concepts and Skills to Master	
<ul style="list-style-type: none"> • Solve a system of linear equations using various representations (numerically, algebraically, and graphically). • Use structure to predict one, infinitely many or no solutions. 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.REI.3 , I.A.REI.5 , I.A.REI.10 , I.A.REI.11 , I.A.REI.12 , I.A.CED.2 , I.A.CED.3 , I.A.CED.4 , I.F.IF.9 , I.F.BF.1 , I.G.GPE.4 , I.G.GPE.5	II.A.REI.7 , II.A.APR.1 , II.A.CED.1 , II.A.CED.2 , II.A.CED.4 , II.A.SSE.2 , II.A.SSE.3 , II.F.LE.3 ; III.A.CED.2 , III.A.CED.3 , III.A.REI.11 , P.N.VM.6, P.N.VM.7, P.N.VM.8, P.N.VM.13, P.A.REI.8, P.A.REI.9

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> • Solve systems of equations graphically (8.EE.8) • Use properties of operations to generate equivalent expressions (7.EE.1)
Academic Vocabulary
System of equations, consistent and inconsistent systems, dependent and independent systems, solution set
Resources
Curriculum Resources : http://www.uen.org/core/core.do?courseNum=5600#70134

Represent and solve equations and inequalities graphically (Standards A.REI.10-12)	
Standard I.A.REI.10: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Identify solutions and non-solutions of linear and exponential equations. Graph points that satisfy linear and exponential equations. Understand that a continuous curve or a line contains an infinite number of solutions. 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.CED.2 , I.A.REI.11 , I.A.REI.12 , I.F.IF.1 , I.F.IF.2 , I.F.IF.4 , I.F.IF.5 , I.F.IF.7 , I.F.BF.1 , I.F.LE.2 , I.S.ID.6	II.F.IF.4 , II.F.IF.5 , II.F.IF.7 , II.F.BF.1 , III.F.IF.4 , III.F.IF.5 , III.F.IF.7 , III.F.TF.2 , P.F.IF.7

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> Solve mathematical problems by graphing points in all four quadrants (6.NS.8) Understand that solutions to equations are values that make the equation or inequality true (6.EE.5) Understand that a graph of a function is the set of ordered pairs consisting of an input and a corresponding output (8.F.1) Construct a function to model a relationship between two quantities (8.F.4)
Academic Vocabulary
Ordered pair, coordinate plane, solution, non-solution, sets
Resources
Curriculum Resources : https://www.uen.org/core/core.do?courseNum=5600#70136

Represent and solve equations and inequalities graphically (Standards A.REI.10-12)	
Standard I.A.REI.11: Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear and exponential functions. ★	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Approximate solutions to systems of two equations using graphing technology. Approximate solutions to systems of two equations using tables of values. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$. Be able to express that when $f(x) = g(x)$, the two equations have the same solution(s). 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.REI.5 , I.A.REI.6 , I.A.REI.10 , I.A.REI.12 , I.F.IF.1 , I.F.IF.2 , I.F.IF.9 , I.F.LE.3	II.F.IF.9 , II.F.LE.3 , III.A.REI.11 , III.F.IF.9 , III.F.LE.3 , P.VM.13

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> Understand that solutions to equations are values that make the equation true (6.EE.5) Understand that a graph of a function is the set of ordered pairs consisting of an input and a corresponding output (8.F.1) Give examples of linear equations with one solution, infinitely many solutions or no solutions (8.EE.7a) Understand that a solution to a system of two linear equations corresponds to points of intersection of their graphs (8.EE.8a)
Academic Vocabulary
Function, intersection, approximate, linear, exponential, $f(x)$, $g(x)$
Resources
Curriculum Resources : https://www.uen.org/core/core.do?courseNum=5600#70137

Represent and solve equations and inequalities graphically (Standards A.REI.10-12)	
Standard I.A.REI.12: Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	
Concepts and Skills to Master	
<ul style="list-style-type: none"> Graph the solution to linear inequalities in two variables. Graph the solution to systems of linear inequalities in two variables. Identify the solutions as a region of the plane. 	
Related Standards: Current Course	Related Standards: Future Courses
I.A.CED.3 , I.A.REI.5 , I.A.REI.6 , I.A.REI.10 , I.A.REI.11 , I.F.IF.1 , I.F.IF.2 , I.F.IF.9 , I.F.LE.3	III.A.CED.3

Support for Teachers

Critical Background Knowledge
<ul style="list-style-type: none"> Understand and solve simple one-step (6.EE.5), two-step (7.EE.4b) and multi-step (8.EE.7b) inequalities in one variable Understand that solutions are values that make the inequality true (6.EE.5) Recognize that there may be infinitely many solutions to an inequality (6.EE.8) Understand that a graph of a function is the set of ordered pairs consisting of an input and a corresponding output (8.F.1) Understand that a solution to a system of two linear equations corresponds to points of intersection of their graphs (8.EE.8a)
Academic Vocabulary
One variable inequality, two variable inequality, half-plane, solution region
Resources
Curriculum Resources : https://www.uen.org/core/core.do?courseNum=5600#70222